VI. Energy Supply Issues

The Energy Supply sector evaluated policy options that would reduce GHG emissions from the generation and transmission of electricity, and the extraction and transmission of oil and gas. This sector accounted for 26 percent of Utah's gross GHG emissions in 2005,[1] excluding electricity exports. The two policy strategies that have the largest potential to reduce GHG are encouragement of renewable energy resources and development of Carbon Capture and Sequestration (CCS) technologies. Options include:

ES-1: Renewable Portfolio Standard 2
ES-2: Create Renewable Energy Development Zones 2
ES-3: Green Power Purchase and Marketing 3
ES-4: Public Benefit Charge 3
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[1] Greenhouse Gas Inventory and Reference Case Projections, 1990-2020; Center for Climate Strategies, February 2007 http://www.deq.utah.gov/BRAC_Climate/docs/Final_Utah_GHG_I&F_Report_3-29-07.pdf]

ES-A - Develop Significant Amount of Renewable Energy Resources

Examples of renewable energy resources include wind, geothermal, solar PV, concentrating solar, biomass, and some hydroelectric facilities.

Benefit/Cost of Reducing CO_2e:

Arizona:	116 MMt between 2007-2020; 10% of 2020 emissions; $6/ton
New Mexico:	26 MMt between 2007-2020; 4.1% of 2020 emissions; $8/ton
Montana:	16.9 MMt between 2007-2020; 5.6% of 2020 emissions; $3/ton
Oregon:	0.8 MMt between 2007-2025; 0.8% of 2025 emissions; Cost effective

ES-1 Renewable Portfolio Standard

Assessment: High Priority. Bin B.

A renewable portfolio standard (RPS) is a requirement that utilities must supply a certain, fixed percentage of electricity from an eligible renewable energy source. Currently 23 states and Washington D.C. have adopted Renewable Portfolio Standards, with Illinois considering RPS legislation in their current legislative sessions. Some states have expanded that notion to include an environmental portfolio standard (EPS) that allows energy efficiency as an eligible resource. In some cases, utilities can also meet their portfolio requirements by purchasing Renewable Energy Certificates (RECs) from eligible renewable energy projects. Utah has the potential to develop and import significant amounts of cost-effective renewable energy resources, which could result in significant economic development potential in Utah and surrounding states, increased energy security, and improved environmental quality. This issue will be explored in more detail in the Renewable Energy Initiative (REI) workgroup.

ES-2 Create Renewable Energy Development Zones

Assessment: High Priority. Bin B.

The establishment of renewable energy development zones would serve two purposes. First, enhance renewable energy development through the reduction of zoning, siting and other regulatory barriers to renewable resources. This is applicable to transmission line capacity, which is one of the largest hurdles to renewable development. Second, provide economic incentives within the development zone, similar to “enterprise zones.”

ES-3 Green Power Purchases and Marketing

Assessment: High Priority. Bin A.

Green Power refers to electricity from environmentally preferred sources, such as renewables. Green Power programs allow consumers to purchase "green tags" along with their electricity ensuring that a quantity of electricity equal to their purchase was produced from renewable resources. In addition, State government could use a green program to purchase a portion of their energy needs from renewable sources.

ES-4 Public Benefit Charge

Assessment: High Priority. Bin B.

A public benefit charge is a fee on utility customers, based on their usage of energy. The revenue generated is to be spent on public goods such as energy efficiency. The funds collected are then provided to a third party to provide energy efficiency programming. Furthermore, the charge can be used to create programs such as a "Clean Energy Fund."

ES-5 Tax Credits and Incentives for Renewable Energy

Assessment: High Priority. Bin A.

Tax credits and incentives are popular and effective policy mechanisms to advance certain technologies, especially those that do not currently benefit from other energy subsidies. Tax credits have been supported by Utah's legislature and can prove very effective for advancing renewable energy generation and efficiency with relatively minimal cost.

ES-6 Pricing and Metering Strategies

Assessment: High Priority. Bin B.

The attractiveness of renewable energy projects to developers and to utilities depends, in part, upon the delivered price of the energy to the purchasing entity. The interconnection and/or net metering policies and processes also play an important role in renewable energy project development. Therefore, pricing and metering strategies must be considered as part of a renewable initiative.

ES-7 Research and Development

Assessment: High Priority. Bin B.

Utah should consider providing support and/or funding for targeted R&D for renewable energy and energy storage. Such R &D may prove very helpful in reducing carbon emissions, while spurring economic development opportunities and technological innovation. As compared with other energy resources and technologies, there is currently very little R&D for renewables being undertaken in Utah. (see also CC-4).

ES-B: Encourage Carbon Capture and Sequestration Technologies

Benefit/Cost of Reducing CO_2e:

New Mexico: 22.7 MMt between 2007-2020; 4.2% of 2020 emissions; $29/ton
Montana: 11.1 MMt between 2007-2020; 5.6% of 2020 emissions; $30/ton

ES-8 Develop CO_2 Capture and Sequestration Policy

Assessment: High Priority. Bin B.

Some of the key questions to be addressed in the development of a consistent regulatory framework for carbon capture and sequestration (CCS) are: immunity from potentially applicable criminal and civil environmental penalties; property rights, including the passage of title to CO_2 (including to the government) during transportation, injection and storage; government-mandated caps on long-term CO_2 liability; the licensing of CO_2 transportation and storage operators, intellectual property rights related to CCS, and monitoring of CO_2 storage facilities. Regulatory barriers may include revisiting the traditional least-cost/least risk regulatory standard or mitigating added risks and financing challenges of CCS projects with assured, timely cost-recovery.

ES-9 Issues for CO_2 Transmission

Assessment: High Priority. Bin B.

Pipelines are required to transport CO_2 to sites that can provide storage. Identify permitting and licensing issues to expedite transmission pipelines. Identify incentives for pipelines, such as direct subsidies, assistance in securing financing and/or off-take agreements, or guaranteed cost recovery.

ES-10 Research and Development

Assessment: High Priority. Bin B.

The State can help secure R&D funding toward sequestration technologies. A goal would be to build an industry around that technology in the state and to set the stage for adoption of the technology for use in the state.

ES-C: Develop and Deploy Advanced Generation Technology

Benefit/Cost of Reducing CO_2e:

N/A

ES-11 Incentives for Advanced Fossil Fuel Technologies that Yield Carbon Reduction Benefits

Assessment: High Priority. Bin B.

Advanced fossil technologies produce lower CO_2 pounds per MWh as a result of more efficient generating technologies (i.e., integrated gasification combined cycle or oxy-combustion technologies) which may also be coupled with carbon capture and sequestration equipment (i.e., chilled ammonia scrubbing). Incentives may be in the form of direct subsidies such as tax incentives to help bridge the cost gap between advanced fossil technologies, compared to traditional technologies or assistance in securing financing. Addressing regulatory barriers may include revisiting the traditional utility least-cost/least risk regulatory standard or mitigating added risks and financing challenges of advanced fossil technologies with assured, timely cost-recovery.

ES-12 Landfill Gas/Waste to Energy that Yield Carbon Reduction Benefits

Assessment: Medium Priority. Bin A.

Landfill Gas to Energy (LGE) is process by which gas is collected from Municipal Solid Waste landfills to generate energy, while reducing methane & CO_2 emissions. Currently in Utah there are three operational projects. LGE projects are “low hanging fruit” that create net benefits to owners, communities, and Utah’s economy. This option could be structured as either a mandate or an incentive program.

ES-15 Nuclear Development

Assessment: Medium Priority. Bin C.

Although there has been some renewed interest in nuclear because of its low carbon emissions, the questions about waste disposal and safety make it unlikely that nuclear energy development will result in near-term reductions in CO_2.

Nuclear energy has a potential to provide substantial carbon emission reductions. Nuclear energy should be evaluated as part of our long-term energy strategy (with due consideration of responsible waste disposal).

ES-D: Improve Efficiency and Reduce CO_2 at Existing Electricity Generation Plants

Benefit/Cost of Reducing CO_2e (GPS only):

New Mexico:	24.3 MMt between 2007-2020; 3.7% of 2020 emissions; $21/ton
Montana:	4.7 MMt between 2007-2020; 1.8% of 2020 emissions; $20/ton
Oregon:	7 MMt between 2007-2025; 7.3% of 2025 emssions; N/A

ES-16 Generation or Emissions Performance Standards

Assessment: High Priority. Bin B.

A generation performance standard is a mandate that requires load serving entities (LSEs) to manage their electricity generation portfolio in such a way as to achieve an average annual pounds per megawatt-hour emissions rate limit. A CO_2 emissions performance standard is a resource procurement mandate that requires LSEs, when entering into new long-term financial commitments for electricity supply, to only acquire electricity from power plants that can demonstrate a maximum CO_2 pounds per megawatt-hour emission rate (for example, 1100 pounds of CO_2 per megawatt-hour). The maximum CO_2 emissions rate may also be based upon an average CO_2 emissions rate over a source's useful life. In both approaches, GHG offsets may be used to achieve compliance.

ES-17 Efficiency Improvements

Assessment: High Priority. Bin A.

Efficiency improvements refer to increasing generation efficiency at power stations through incremental improvements at existing plants (e.g., more efficient boilers and turbines, improved control systems, or combined cycle technology).

ES-19 Retrofit Plants w/CO_2 Capture

Assessment: High Priority. Bin C.

Technology is emerging for capturing CO_2 on existing power plants including chilled ammonia and other amine scrubbing technologies. These technologies have not been demonstrated at commercial scale, and the economics of such technologies are still being defined. See ES-B for further discussion on CO_2 sequestration.

ES-20 Retire Old Plant; Build New Low-Carbon Greenfield Plant

Assessment: High Priority. Bin B.

New low carbon plants could be built to replace older/existing plants that consume high carbon fuels. Such plants could be constructed at sites that have never been used for industrial purposes (Greenfield), or could be constructed at former power plants or other industrial sites (Brownfield). Several regulatory issues need to be addressed, including cost recovery of stranded investment and least cost planning.

ES-E: Promote Combined Heat and Power (CHP)–Distributed Generation (DG)

Benefit/Cost of Reducing CO_2e:

New Mexico: 6.1 MMt between 2007-2020; 0.9% of 2020 emissions; $4/ton
Montana: 5 MMt between 2007-2020; 1.6% of 2020 emissions; $16/ton
Oregon: 0.5 MMt between 2007-2025; 0.6% of 2025 emissions; N/A

ES-21 Incentives and Barrier Reductions for CHP and DG

Assessment: High Priority. Bin B.

Barriers to CHP and clean DG include inadequate information, institutional barriers, high transaction costs because of small projects, high financing costs because of lender unfamiliarity and perceived risk, "split incentives" between building owners and tenants, and utility-related policies like interconnection requirement, high standby rates, and exit fees. The lack of standard offer or long-term contracts, payment at avoided cost levels, and lack of recognition for emissions reduction value provided also creates obstacles.

Policies to remove these barriers include: improved interconnection policies; improved rates and fees policies; streamlined permitting; recognition of the emission reduction value provided by CHP and clean DG; financing packages and bonding programs; power procurement policies; education and outreach.

ES-F: Improve Efficiency of Electric Transmission and Distribution System

Benefit/Cost of Reducing CO_2e:

N/A

ES-22 Remove Transmission/Distribution System Limitations and Other Infrastructure Barriers for Renewables and Other Clean Distributed Generation

Assessment: High Priority. Bin B.

This is extremely important, especially for the development of clean energy.   Improving the regulatory process for siting and permitting of new transmission lines and smart grid development (defined as an enhanced electric transmission or distribution network that provides smart metering, distributed generation management, and demand response, among other benefits) is critical to support the development of renewable energy, in that transmission and effective metering policies/technologies must be in place to move all energy to market.

ES-23 Transmission System Upgrading

Assessment: High Priority. Bin B.

Upgrading the transmission system will improve overall system efficiency, reduce SF_6 emissions, and reduce line losses.

ES-H Miscellaneous Energy Supply Options

Benefit/Cost of Reducing CO_2e:

N/A

ES-26 Research and Development

Assessment: High Priority. Bin A.

Targeted R&D may be very helpful in ultimately reducing carbon emissions in such areas as renewables, advanced generation technologies, carbon sequestration, and energy storage (relates to CC-4).

ES-27 Remove Regulatory Barriers

Assessment: High Priority. Bin B.

In some instances, specific regulatory challenges have been identified within other policy options. General regulatory barriers include insufficient resources or staffing to addressing emerging issues (i.e., permitting related to GHG emissions, analysis of geological sequestration, or renewables capacity potential). Others include revisiting the traditional least-cost/least risk regulatory standard or mitigating added risks and financing challenges of advanced energy supply technologies with assured, timely cost-recovery.

ES-28 Tax Credits and Incentives

Assessment: High Priority. Bin B.

Tax credits and other incentives are tools that may be applied to encourage the reduction of CO_2 in the energy supply sector.

Goals:

Goal 1: (ES-A) Develop significant amount of renewable energy resources using these tools:

a. Renewable Portfolio Standard (ES-1)
b. Renewable Energy Development Zones (ES-2)
c. Green Power Purchase and Marketing (ES-3)
d. Public Benefit Charge (ES-4)
e. Tax Credit and Incentives for Renewable Energy (ES-5)
f. Pricing and metering strategies (ES-6)
g. Research and development (ES-7)

Goal 2: (ES-B) Encourage carbon capturing and sequestration technologies by:

a. Developing CO_2 Capture and Sequestration Policy (ES-8)
b. Addressing CO_2 transmission issues (ES-9)
c. Supporting research and development (ES-10)

Goal 3: (ES-C)Develop and deploy advanced generation technology including:

a. Incentives for advanced fossil fuel technologies that yield carbon reduction benefits (ES-11)
b. Landfill Gas/Waste to Energy that yield Carbon reduction benefits (ES-12)
c. Nuclear development

Goal 4: (ES-D) Improve energy efficiency and reduce CO_2 at existing electricity generation plants through:

a. Generation or Emissions Performance Standards (ES-16)
b. Efficiency improvements (ES-17)
c. Retrofit plants with CO_2 capture (ES-19)
e. Retire old plant: build new low-carbon Greenfield plant (ES-20)

Goal 5: (ES-E) Promote Combined Heat and Power (CHP) Distributed Generation (DG) by:

a. Offering incentives and reducing barriers (ES-21)

Goal 6: (ES-F) Improve efficiency of electric transmission and distribution system by:

a. Removing transmission/distribution system limitations and other infrastructure barriers for renewables and other clean distributed generation (ES-22)
b. Transmission system upgrading (ES-23)

Goal 7: (ES-H) Adopt miscellaneous options including:

a. Research and development (ES-26)
b. Remove regulatory barriers (ES-27)
c. Tax credits and incentives (ES-28)

Sorted by Priority:

The policy options were ranked first by priority and second by bin classification. Priority was assigned after consideration of the amount of CO_2 reduction potential, the criticality of the option to enable the related reduction pathway, the apparent cost/benefit, and the implementation time horizon (long-term vs. short-term). The bin ranking was assigned after consideration of cost (dollar amount, effort and benefits), and political and technical feasibility.

#	Policy Option	Priority	Bin	Vote
ES-10	Carbon Capture and Sequestration Research and Development	High	B	20
ES-11	Incentives for Advanced Fossil Fuel Technologies that Yield Carbon Reduction Benefits	High	B	20
ES-23	Transmission System Upgrading	High	B	19
ES-28	Tax Credits and Initiatives	High	B	19
ES-17	Efficiency Improvements	High	A	18
ES-5	Tax Credits and Incentives for Renewable Energy	High	A	18
ES-27	Remove Regulatory Barriers	High	B	18
ES-8	Develop CO2 Capture and Sequestration Policy	High	B	18
ES-1	Renewable Portfolio Standard	High	B	17
ES-22	Remove Transmission/Distribution System Limitations and Other Infrastructure Barriers for Renewables and Other Clean Distributed Generation	High	B	16
ES-7	Renewable Energy and Energy Storage Research and Development	High	B	16
ES-26	Research and Development	High	A	15
ES-3	Green Power Purchase and Marketing	High	A	15
ES-19	Retrofit Plants w/CO2 Capture	High	C	15
ES-21	Incentives and Barrier Reductions for CHP and DG	High	B	14
ES-2	Create Renewable Energy Development Zones	High	B	11
ES-9	Issues for CO2 Transmission	High	B	10
ES-20	Retire Old Plant; Build New Low-Carbon Greenfield Plant	High	B	9
ES-4	Public Benefit Charge	High	B	9
ES-6	Pricing and Metering Strategies	High	B	9
ES-16	Generation or Emissions Performance Standards	High	B	7
ES-12	Landfill Gas/Waste to Energy that Yield Carbon Reduction Benefits	Medium	A	17
ES-15	Nuclear Development	Medium	C	14

Sorted by Votes:

#	Policy Option	Priority	Bin	Vote
ES-10	Carbon Capture and Sequestration Research and Development	High	B	20
ES-11	Incentives for Advanced Fossil Fuel Technologies that Yield Carbon Reduction Benefits	High	B	20
ES-23	Transmission System Upgrading	High	B	19
ES-28	Tax Credits and Initiatives	High	B	19
ES-17	Efficiency Improvements	High	A	18
ES-27	Remove Regulatory Barriers	High	B	18
ES-5	Tax Credits and Incentives for Renewable Energy	High	A	18
ES-8	Develop CO2 Capture and Sequestration Policy	High	B	18
ES-1	Renewable Portfolio Standard	High	B	17
ES-12	Landfill Gas/Waste to Energy that Yield Carbon Reduction Benefits	Medium	A	17
ES-22	Remove Transmission/Distribution System Limitations and Other Infrastructure Barriers for Renewables and Other Clean Distributed Generation	High	B	16
ES-7	Renewable Energy and Energy Storage Research and Development	High	B	16
ES-19	Retrofit Plants w/CO2 Capture	High	C	15
ES-26	Research and Development	High	A	15
ES-3	Green Power Purchase and Marketing	High	A	15
ES-15	Nuclear Development	Medium	C	14
ES-21	Incentives and Barrier Reductions for CHP and DG	High	B	14
ES-2	Create Renewable Energy Development Zones	High	B	11
ES-9	Issues for CO2 Transmission	High	B	10
ES-20	Retire Old Plant; Build New Low-Carbon Greenfield Plant	High	B	9
ES-4	Public Benefit Charge	High	B	9
ES-6	Pricing and Metering Strategies	High	B	9
ES-16	Generation or Emissions Performance Standards	High	B	7

Public Comment

Submitted by Kyle L. Davis, PacifiCorp, June 4, 2007

Utah Blue Ribbon Advisory Council on Climate Change - Energy Supply Catalog of State Actions

Proposed IGCC/CCS Incentives in Utah (ES Cat B and Cat C)

A. The Need for Clean Coal Technologies to Meet Emissions Reduction Targets.

On May 21, 2007, Governor Huntsman signed on to the Western Regional Climate Action Initiative.[2] The Initiative directs the states of Arizona, California, New Mexico, Oregon, Washington, and now Utah to develop a regional target for reducing greenhouse gases (GHG) by August 2007. By August 2008, they are expected to devise a market-based program, such as a load-based cap-and-trade program to reach the GHG target. The five states also have agreed to participate in a multi-state registry to track and manage greenhouse gas emissions in their region.

In addition to increased efficiency and renewable energy investment, the development and commercialization of advanced clean coal technology is a critical third component in the portfolio of GHG mitigation actions. The most viable of these technologies today appears to be Integrated Gasification Combined Cycle (IGCC) combined with carbon capture and storage (CCS) technology. There are also emerging CCS technologies that show promise for capturing carbon emissions from traditional pulverized coal fired boilers. These emerging technologies include chilled ammonia scrubbing and oxy-fuel combustion. Carbon capture technologies have the potential to remove approximately 90 percent of a coal plant's CO2 emissions.[3]

IGCC plants generate electricity by gasifying coal and using clean "syn-gas" to fuel a combustion turbine in a combined cycle configuration. IGCC technologies have improved efficiencies compared to traditional pulverized coal plants. The overall efficiency of an IGCC plant depends on gasifier technology and coal type. Improvements in overall efficiency translate into reductions in CO2 emissions; for every one percent of efficiency gain, a plant produces about 2 percent less CO2 per kWh.[4] A generic IGCC plant has a CO2 emissions rate of 1600-1760 lb/MWh as compared to a rate of 2000 lb/MWh for a traditional coal plant.[5] IGCC plants also have reduced air pollutant emissions, such as sulfur dioxide (SO2), nitrogen oxide (NOX) and mercury,[6] compared to pulverized coal-fired plants.

[2] See, http://gov.ca.gov/mp3/press/022607_WesternClimateAgreementFinal.pdf

[3] PacifiCorp's 2004 IRP at 23, located at http://www.pacificorp.com/File/File47422.

[4] U.S. Department of Energy Fact Sheet: Clean Coal Technology Ushers in New Era in Energy, located at http://www.state.gov/g/oes/rls/or/2006/77196.

[5] "Exhibit 3-18, Emission Data from the Literature" page 3-29, from the Final Report, "Environmental Footprints and Costs of Coal-Based Integrated Gasification Combined Cycle and Pulverized Coal Technologies", EPA-430/R-06-006, United States Environmental Protection Agency, July 2006, located at http://www.epa.gov/airmarkets/articles/IGCCreport.pdf.

[6] PacifiCorp's 2004 Integrated Resource Plan (IRP) Update estimated IGCC reductions of 73% for SO2, 85% for NOX and 22% for mercury over a supercritical pulverized coal plant. PacifiCorp's 2004 IRP Update at 24, located at http://pacificorp.com/File/File57884.

Additionally, using currently available commercial separation technologies, the cost of carbon capture from an IGCC plant is expected to be lower than the cost to capture carbon emissions from a traditional pulverized coal plant.

Both environmental and national security concerns support the accelerated development of advanced clean coal technologies. The North American Electricity Reliability Council recently reported that demand for electricity is increasing three times faster than new generating resources can be added.[7] Coal is the nation's most abundant fuel source.[8] Coal now accounts for 50 percent of the electricity generated in the U.S. and, as the lowest cost source of electricity generation, this percentage is expected to increase.[9]

The important role of advanced clean coal technology is recognized in the Western Public Utility Commissions' Joint Action Framework on Climate Change, signed on December 1, 2006 by the Washington, Oregon, California and New Mexico public utility commissions.[10] The Framework's Statement of Shared Principles includes five principles, the second of which is "Development and use of low carbon technologies in the energy sector." The third of six Action Items is: "Explore ways to remove barriers to development of advanced, low-carbon technologies for fossil fuel-powered generation capable of capturing and sequestering carbon dioxide emissions."

B. Removing Barriers and Providing Incentives to IGCC and CCS Technology Commercialization.

There are a number of barriers that stand in the way of large scale commercial development of IGCC and CCS technologies, particularly for investor-owned utilities (IOUs). Over the last several years, many states and the federal government have passed laws to address the most problematic of these. To promote Utah policies on climate change and sustainability, Utah should join these lawmakers in enacting clean coal legislation.

a. The Need for a Comprehensive Legal and Regulatory Framework for CCS.

CCS raises new legal and regulatory risks associated with siting and permitting projects, CO2 transportation, injection and storage.[11] These risks are not yet fully understood, nor are uniform standards or government regimes in place to address and mitigate them.

Among the key questions to be addressed in the development of a consistent regulatory framework for CCS are: immunity from potentially applicable criminal and civil environmental penalties; property rights, including the passage of title to CO2 (including to the government) during

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[7] *Mixed Signals Leave Developers Wary of Building New Infrastructure*, 144 Pub Util Fort 4 (Nov 2006).

[8] *Financing Clean Coal*, 143 Pub Util Fort 73 (June 2005).

[9] U.S. Department of Energy Fact Sheet, supra note 3.

[10] Western Public Utility Commissions' Joint Action Framework on Climate Change (December 1, 2006), located at http://www.puc.state.or.us/puc/news/2006/2006026jointaction.

[11] Robertson, K., Findsen, J., Messner, S., Science Applications International Corporation. June 23, 2006. "International Carbon Capture and Storage Projects Overcoming Legal Barriers", prepared for the National Energy Technology Laboratory (see http://www.netl.doe.gov/energy-analyses/pubs/CCSregulatorypaperFinalReport.pdf)

transportation, injection and storage; government-mandated caps on long-term CO2 liability, insurance coverage for short-term CO2 liability; the licensing of CO2 transportation and storage operators, intellectual property rights related to CCS, and monitoring of CO2 storage facilities.

California recently adopted AB 1925, directing the California Energy Commission to recommend standards to accelerate the adoption of long-term management of industrial CO2.[12] Utah should similarly develop guidelines for addressing the emerging legal and regulatory issues associated with CCS. Among the options it should explore is that adopted by Texas, which transfers the title (and any liability post-capture) to CO2 captured by CCS to the Railroads Commission of Texas.[13]

b. The Traditional Least-Cost/Least Risk Regulatory Standard Should Be Modified to Allow Development of CCS-Equipped IGCC and Pulverized Coal Resources.

IGCC plants have higher capital and operating costs than traditional coal plants. PacifiCorp's 2004 Integrated Resource Plan Update analyzed the costs of an IGCC plant equipped with CCS technology. This analysis demonstrated that a CCS-ready, IGCC plant costs at least 16.9% more than a supercritical pulverized coal plant.[14] Additionally, while reliable estimates for carbon geologic sequestration costs do not yet exist, the Department of Energy's research program goal is $10 per MWh.[15]

IOUs in Utah are subject to a least cost, least risk standard for new resources.[16] Additionally, Utah IOUs are required to implement their integrated resource plans through competitive bidding to ensure implementation of this least cost policy.[17] Because the costs of IGCC and CCS technologies are higher than uncontrolled traditional pulverized coal, an IGCC or a CCS investment is difficult to justify under a least cost/least risk standard. For example, in 2003, the Wisconsin Public Service Commission rejected Wisconsin Electric's request for a certificate of need for an IGCC plant on the basis that the plant was not cost-effective.[18]

Utah should eliminate this barrier to IGCC and CCS technologies for IOUs by adopting a "reasonable and necessary" standard for IGCC and CCS technologies used to serve Utah customers, in place of a least cost/least risk standard. Indiana adopted a similar approach, requiring the Indiana

[12] California AB 1925 (2006), located at http://www.leginfo.ca.gov/pub/05-06/bill/asm/ab_1901-1950/ab_1925_bill_20060926_chaptered.

[13] Texas H.B. 149 (2006).

[14] PacifiCorp 2004 IRP Update at 24, supra note 5.

[15] *Id*.

[16] *See Energy Resource Procurement Act, Utah Code Ann. § 54-17-302(3)*

[17] *See Energy Resource Procurement Act, Utah Code Ann. § 54-17-101 et. seq. (for resources greater than 100 MW with a life or term of ten years or more.)*

[18] *In re: Wisconsin Electric Power Company*, 05-CE-130 (Nov 10, 2003).

Utility Regulatory Commission to encourage the development of IGCC and CCS as long as it concludes that the projects are reasonable and necessary.[19]

c. Utah Should Enact Tax Incentives to Help Bridge the Cost Gap Between IGCC and CCS Technologies and Traditional Uncontrolled Coal.

To bridge the cost gap between IGCC and CCS technologies and traditional coal, EPACT 2005 contained new investment tax credits for advanced coal technologies, including IGCC.[20] EPACT 2005's IGCC tax credits were heavily over-subscribed, however, with applications totaling $5 billion for only $1.6 billion in credits.[21]

Utah should enact tax incentives to encourage new IGCC and CCS development to serve Utah customers, adding to those already exhausted under EPACT 2005. The most effective combination of tax incentives for IOU development of IGCC and CCS technologies is a tax credit plus accelerated depreciation.

d. The Added Risks and Financing Challenges of IGCC and CCS Should Be Mitigated With Assured, Timely Cost-Recovery.

The developmental nature of IGCC and CCS technologies creates added risk and cost during the pre-construction phase, in construction of the plant and in the plant's performance. While engineering and construction designs for a traditional coal plant cost less than $1 million, an IGCC plant cannot be built without a Front End Engineering Design (FEED) study. Such a study costs $10-$20 million and requires 10-14 months for completion.[22] Because commercial-scale IGCC and CCS technologies are new, the risk of cost-overruns, construction delays and delays in achieving anticipated reliability levels are all higher than for a traditional coal plant.

This added risk and cost create financing challenges for an IGCC or CCS investment. Assured, timely cost recovery, typically achieved by "pay as you go" proposals, is necessary for large IGCC or CCS projects to obtain financing and move forward. For example, the Ohio Public Utilities Commission recently allowed American Electric Power (AEP) to recover an estimated $23.7 million in first-phase IGCC pre-construction costs through a 12-month generation surcharge.[23] AEP proposed a second-phase of recovery during construction to cover financing costs, and a third-phase to recovery the costs of the plant after it becomes operational. Similarly, the Indiana Utility Regulatory Commission approved the requests of two utilities for deferral and recovery of IGCC pre-construction costs.[24]

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[19] IC 8-1-8.8-11(a), provides that "The Commission shall encourage clean coal and energy projects by creating the following financial incentives for clean coal and energy projects, if the projects are found to be reasonable and necessary."

[20] EPACT 2005, Title XIII, Subtitle A, Section 1307

[21] U.S. Department of Energy Fact Sheet, supra note 3.

[22] PacifiCorp 2004 IRP Update at 26, supra note 5.

[23] *In re Columbus Southern Power Co. and Ohio Power Co.*, Case No. 05-376-EL-UNC (Ohio PUC April 10, 2006).

[24] *In re PSI Energy*, Cause 42894 (Indiana URC July 26, 2006).

Utah should adopt a full and timely cost-recovery standard for IOU investment in IGCC or CCS technologies used to serve Utah customers. Utah Code Ann. § 54-4-4(3) currently allows, but does not require, the Commission to use a future test period in setting retail rates.[25] To mandate "pay as you go" cost recovery for IGCC or CCS investments, Utah's clean coal legislation would need to create a limited exception to this statute for IGCC and CCS investments. Colorado, Indiana and Pennsylvania all provide full cost-recovery assurances for IGCC and CCS by statute; Colorado additionally includes recovery for replacement power costs associated with unplanned IGCC plant outages.[26]

[25] Utah Code Ann. § 54-4-4((3) (a) If in the commission's determination of just and reasonable rates the commission uses a test period, the commission shall select a test period that, on the basis of evidence, the commission finds best reflects the conditions that a public utility will encounter during the period when the rates determined by the commission will be in effect.

(b) In establishing the test period determined in Subsection (3)(a), the commission may use:

(i) a future test period that is determined on the basis of projected data not exceeding 20 months from the date a proposed rate increase or decrease is filed with the commission under Section 54 7 12;

(ii) a test period that is:

(A) determined on the basis of historic data; and

(B) adjusted for known and measurable changes; or

(iii) a test period that is determined on the basis of a combination of:

(A) future projections; and

(B) historic data..

[26] Colorado House Bill 06-1281; Indiana IC 8-1-8.8; Pennsylvania SB 1030.

Public Comment

Submitted by Hans Ehrbar, Utah Jobs with Justice, June 20, 2007

Utah has exceptional potential for solar and geothermal renewable energy. Since these technologies are in their infancy, they may still be less cost effective than other renewable sources. This note here discusses policies that would push them forward along their technological development path. Such policies not only have the advantage of providing Utahns with locally produced clean energy, but they also have the potential to develop Utah into a technology center for geothermal and solar energy.

Photovoltaic Solar Energy

One of the most important policies under consideration by the State of Utah is the requirement that Utah power companies provide a certain percentage of their power from renewable sources (RPS, renewable portfolio standards). This is a necessary step which deserves full support. But additional policies are needed to address Utah's special situation.

Experience from other states shows that RPS typically promotes the one presently cheapest clean energy, which is wind-generated electricity. Electricity generated by solar panels mounted on individual homes is still too expensive (although the costs are slowly falling), and it is difficult for homeowners to get favorable credit terms. Specific policies are needed to encourage the installation of solar panels. Germany's Feed-In Tariffs (FIT) are a possibility which proved successful: the utility companies have to write long term contracts (up to 20 years) in which they obligate themselves to photovoltaic electricity from the households at prices covering the producer's costs plus a little bit of profit. This cost structure is such that the distributed energy suppliers get a higher price from solar panels installed this year than if they wait and install slightly more efficient solar panels next year. This generates a predictable revenue stream which can be easily financed, thus encouraging early adoption of the technology. This again accelerates the process in which this technology matures and becomes cost effective. Data are available which say that this makes photovoltaic energy cheaper in the long run than other policies.

Utah is less densely populated than Germany and has much more sun. Therefore an adaptation of FIT to Utah might want to tie the capacity installed in a household to the average consumption of that household, in order to locally match the distributed generation of electricity with its consumption. There is also a good temporal match
since PVC cells produce most at the times of peak demand from air conditioners. An obstacle to be overcome in Utah would be the requirements that power companies buy only the cheapest power. In the long term, the policies proposed here are cheaper than seeking the lowest price at the moment.

Geothermal Energy

Utah has the capacity to produce 30 percent of its electricity by geothermal means. Geothermal energy is the only renewable energy which can provide the base load without having to store energy. It uses little water and produces little noise. In addition, it can
quickly and easily adapt its output to demand. Given these advantages, geothermal energy should be targeted as one of the backbones of the electricity supply in Utah. Since experience with geothermal as one of the main pillars of energy supply is rare, Utah can break new paths with carefully selected policies.

Geothermal facilities are small enough to be owned locally and clean enough to be situated near living areas. The technology is amenable to direct use of the heat; in some situations, geothermal energy must even be considered principally a source of heat, with electricity an additional bonus. Therefore policies are necessary to encourage direct use of the heat for space heating and greenhouses etc., in addition to the electricity use.

The main cost factor in geothermal energy is the location and drilling of the wells. Wells must be deep, which makes them expensive, and it is not certain whether they will be fruitful. Federal (DOE) or state programs for cost-shared drilling and the funding of the initial well for a small company might be considered. Geothermal drilling is a somewhat neglected sibling of oil drilling; there is high potential for efficiency improvements by targeted research. After the initial investment, operating costs are low; therefore low-cost loans would lower the threshold for private investment. The State government may also consider guaranteeing power purchase agreements between utilities and power companies in order to lower the interest costs.

Public Comment

Submitted by David Litvin, President of the Utah Mining Association and BRAC Member, via e-mail on July 17, 2007

TO: All Board Members

BRAC Draft Report

As requested by the July 12 e-mail, I offer the following three comments as we move closer to a final BRAC report:

1) Natural V.S. Manmade Greenhouse Gas Emissions:

The BRAC report should include a section setting forth the relative contributions of Greenhouse Gas Emissions (GHG) between natural and man-made sources, as well as Utah's contribution, as compared to total global emission levels. For each BRAC policy option. The expected amount of GHG emissions reduction should be quantified to the extent feasible. This information will assist Governor Huntsman and other readers of the BRAC report to put into proper context the level of Utah's man-made emission levels. I would hope that the technical BRAC staff are now compiling this information for the final BRAC report.

2) Guiding Principles:

Accompanying the individual policy option recommendation the BRAC will forward to Governor Huntsman in the final report should include a list of guiding principles that will provide Utah policymakers with an overall structure for helping to determine which policy options should be pursued. In this regard, I have provided below an initial list of guiding principles which should help initiate a dialogue on this important endeavor:

- Mankind's contribution to climate change GHG emissions is a global phenomenon that will require a comprehensive, long-term and worldwide response;
- The time frames for implementation of any climate change program to reduce GHG emission must be tied to technology availability, reliability and economic feasibility to avoid unnecessary impacts on Utah's citizens;
- Climate change programs designed to reduce GHG emissions should set achievable emission reduction targets with appropriate compliance periods without dictating specific required technologies or discriminating among different types of energy sources;
- Any GHG emissions reduction programs should not fall only on a portion of Utah's economy but include all sources of GHGs emissions;
- Any GHG emission reduction program should incorporate a fully-transparent cost-benefit analysis so that Utah consumers are aware of the potential economic impacts of policies prior to their implementation;
- Programs should be established which encourage the rapid research, development, demonstration and deployment, through public-private partnerships, of a broad spectrum of supply-side and demand-side technologies and practices, including energy efficiency, renewable technologies, fossil energy technologies and other appropriate energy technologies;

- Access to public lands for the development and transmission of domestic energy resources - such as renewables, oil-and-gas, oil shale and coal - that can be used in power generation technologies that can help Utah meet its growing energy demand while reducing its GHG emissions should be ensured.

3) Energy Technologies:

Throughout the policy option write-ups, specific energy technologies are given preferential treatment being described as "green power," "environmentally preferred," "clean energy" and so on. Such labels need to be removed in each policy option write-up in the final report. Why? Because such labels are incorrect and not defensible. For example, one may say that "wind" power is environmentally-preferred over other types of energy technologies. However, if you were a bird lover you probably would think not, since wind power is the largest source of bird kills in the U.S. Furthermore, if energy production reliability was your most important environmental criteria, solar or wind would not be environmentally-preferred since they are not dependable when it is cloudy or a calm day. Wood burning, a renewable energy source, is not environmentally healthy when burned in a confined area without proper combustion or emissions controls. Coal and nuclear have a very small land impact, in cases where land use values are a critically important factor. The point is, each energy technology offers certain benefits and challenges, and we should not, in this report, improperly label certain technologies being better than others. It is just wrong and not defensible. The fact is, we will need all available energy technologies to meet Utah's growing energy needs.

Best regards,

David Litvin
President
Utah Mining Association
office: 801-364-1874

Response submitted by Jordan Gates, Salt Lake City Mayor Rocky Anderson's Office, via e-mail on July 18, 2007

Good Morning David,

I was nice to meet you last Tuesday as I represented Mayor Anderson on the BRAC. I would like to respectfully add my 2 cents to your recommendations. While I would agree that studying the natural production of CO2 emissions is essential to fully understand the complexity of global warming and climate change, I would caution that we do not do so at the expense of time that could be better spent exploring options to reduce the human contribution green house gases. Our primary Charge, as I understand it, is to study the potential effects of Climate Change on the state of Utah and develop policy recommendations for the Governor that will substantially reduce the CO2 emissions caused by anthropogenic sources, (i.e. energy production and changes in land use)

It's true that natural sources of CO2 emissions are globally larger than anthropogenic CO2 emissions. However, for the last 650,000 years the amount of carbon going into the atmosphere was steadied by a delicate balance. Since that time human beings, unknowingly, have upset this balance. On average humans produce about 26 billion tonnes of CO2 annually but, unlike nature, we are not removing any. Because of this imbalance atmospheric concentration of CO2 has now risen by over 35%, higher than any point in the last 800,000 years. It is imperative that we reduce this disastrous trend

I also have to disagree that the language used to describe renewable energy as clean, green and/or preferable is “indefensible.” While the issues you raise regarding these energy technologies are compelling, (I’m not familiar with wind turbines being the “largest source of bird kills in the U.S.” if you could provide a source for this information I would love to look into it) I would argue that the significant reduction in CO2 emissions that each of these technologies provides validate the use of said terms. If our charge is to examine policies to reduce CO2 emissions, then these technologies are indeed preferable. I believe this is the argument being used to further explore nuclear energy as an alternative to fossil fuels.

I look forward to further participation in this process

Regards,

Jordan Gates

Environmental Advisor to the Mayor
Salt Lake City Mayor's Office
451 South State Street #306
Salt Lake City, UT 84111
801.535.7939

Public Comment

Submitted by John R. Baza, Director of the Utah Division of Oil, Gas, and Mining on June 20, 2007 and handed out at BRAC meeting on July 10, 2007

James and Glade,

I've attached a Word document with language that I've drafted for the two policy options that I was assigned to address. I've collaborated with Mike Golas on the language, so we both feel comfortable with the statements.

The assignment of "medium priority", "Bin D" description is probably misstated and is somewhat based on a presumption that emissions from energy extraction operations are creating a large problem. I encourage additional and adequate study of current conditions, because both Mike G. and I sense that emissions risks are low in a majority of operations. In many cases where the emission risk is high, controls are mandatory Furthermore, especially with the value of natural gas, there are all kinds of controls in place to not release those dollars into the atmosphere. Therefore we suggest a low priority, Bin C designation as most appropriate. Such is indicated on the attached document.

Let me or Mike know if you have questions, otherwise we'll see you at next week's meeting.

John Baza

John R. Baza, P.E.
Director
State of Utah
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Attachment:

ES-19 GHG emissions reduction from fuel combustion in extraction operations

Assessment: Low Priority – Bin C

Fuel combustion in extraction operations can take several forms and must be addressed as separate components of any GHG emissions reduction strategy. In all phases of exploration and production, vehicles transport workers and material over long distances, and emissions reduction for this component should be tied to overall automotive emissions reduction state-wide. In the case of various mined mineral commodities, long distance transportation is often accomplished by railway. Another component of the strategy could be to address railroad transportation emissions reduction.

All fuel combustion equipment that is utilized in energy extraction represents consumptive cost to a business venture and acts as a natural disincentive to unnecessary fuel utilization and the corresponding emissions. Thus, in order to reduce business expenses, many companies in the energy and minerals extraction industry have voluntarily worked toward higher efficiency engines, lower fuel consumption, or alternative fuels that result in lower combustion emissions.

Policies to encourage combustion-related GHG emissions reduction could include tax credits for mineral or petroleum producers or establishment of a state recognition program for voluntary efforts such as EPA's Natural Gas Star program.

Any policy for GHG emissions reduction will require determination of baseline performance and characterization of the subsequent effects of implementing new emission reduction strategies and technologies. The levels of such emissions are not well documented through current regulatory reporting channels, and available estimates or inventories may overstate the GHG emissions that are occurring. Even if some extraction and transportation companies have such information in detail or the means to obtain it, disclosure of such information should be constructively encouraged while avoiding the imposition of regulatory requirement. Companies should be rewarded for voluntary participation in GHG emissions reduction, but not penalized for non-participation.

ES-44 Leakage reduction program

Assessment: Low Priority – Bin C

Estimates of methane loss during production, processing and transportation of hydrocarbons vary greatly, leading to inaccurate characterization of such emissions. Because methane is a saleable commodity, there is an inherent value that promotes capture and retention of the material. This inherent value also drives regulations (federal and State) that are in place to prevent the waste of and require control of such emissions where there is known to be a risk of significant emissions occurring.

Many new emission control technologies have been implemented in recent years, and typical crude oils and natural gas produced in Utah oil and gas fields are of a type that would not lead to large emissions of methane if normal operational procedures are executed. Utah DEQ is nevertheless assembling a state-wide estimate of such emissions at oil and gas facilities. There is no comparable estimate being assembled state-wide for emissions during transmission all the way to the end user although there are EPA and international technical protocols for estimating such emissions.

Policies to encourage leakage reduction could include tax credits for mineral or petroleum producers or establishment of a state recognition program for voluntary efforts such as U.S. Environmental Protection Agency's Natural Gas Star program.

Any policy for leakage reduction will require determination of baseline performance and characterization of the subsequent effects of implementing new emission reduction strategies and technologies. The levels of such emissions are not well documented through current regulatory reporting channels, and available estimates or inventories may overstate the leakage quantities that are occurring. Even if some extraction and transportation companies have such information in detail or the means to obtain it, disclosure of such information should be constructively encouraged while avoiding the imposition of regulatory requirement. Companies should be rewarded for voluntary participation in leakage reduction, but not penalized for non-participation.

Public Comment

Submitted by James Holtkamp, Holland and Hart, for Questar on August 16, 2006

Re: Questar comments on BRAC report

Dear Dr. Nielson:

On behalf of Questar, we offer the following comment on the Climate Change Work Group's report to the Governor's Blue Ribbon Advisory Commission on Climate Change. In particular, Questar suggests amplifying ES-18 and TL-7 as follows:

> It will take time for demand-side conservation measures and renewable energy to make a significant dent in Utah's energy mix. Natural gas is an abundant and clean source of energy. The emissions of CO2 per BTU of natural gas burned are significantly less than for other types of fossil fuels. Natural gas is already widely used for residential and commercial heating, generation of electricity and a variety of manufacturing processes. Natural gas is also used as a transportation fuel, particularly in mass transit, and increasing numbers of passenger vehicles are converting to use natural gas as fuel. In addition, the technology and infrastructure for producing, transporting and delivering natural gas is well-developed. Therefore, natural gas can make an immediate impact as a "bridge fuel" to a carbon-constrained energy future as we move toward more renewable energy sources and better technology to reduce and even eliminate carbon dioxide emissions from energy generation and use..
>
> Recommendation: Encourage and incentivize environmentally responsible development, production and use of natural gas. (ES-18; TL-7)

The foregoing recommendation was discussed at the Commission's August 14 meeting. We are submitting it in this letter for inclusion in the record of the Commission's deliberations.

Sincerely yours,

James A. Holtkamp
for Holland & Hart LLP

JAH:mf

cc: Thomas Jepperson
Ruland Gill